

AMENDMENTS TO THE CLAIMS:

The following listing of claims will replace all prior versions of claims in the application:

1. (Currently Amended) A method for routing a data packet through an explicit path in a data communication network, said data packet having an incoming global path identifier corresponding to said explicit path, said data communication network comprising a plurality of network nodes, each of said plurality of network nodes including a network device, said explicit path comprising a plurality of hops including a prior hop, a current hop, and a next hop, each of said plurality of hops being associated with one of said plurality of network nodes, the method comprising the steps of:

receiving a said data packet from said prior hop at said current hop in said in a first network device;

~~determining whether said received data packet contains a global path identifier, and if so,~~
performing a look-up function into a forwarding table using an index based on said incoming global path identifier to determine a forwarding table entry related to said the next hop to which said ~~received~~ data packet should be forwarded;

calculating ~~a new~~ an outgoing global path identifier for said data packet as a function of (1) said incoming global path identifier and ~~of the address of a port on the~~ (2) an identifier of said network device receiving said data packet at said current hop; and

forwarding said data packet to said next hop.

2. (Currently Amended) The method according to claim 1, wherein there are two explicit paths that merge at a network node and share a single same entry in said forwarding table in all downstream network nodes.

3. (Currently Amended) The method according to claim 1, wherein said outgoing global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

4. (Currently Amended) The method according to claim 2, wherein said outgoing global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

5. (Currently Amended) The method according to claim 1, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing ~~the~~ a bit-wise Exclusive-Or function on said incoming global path identifier and said ~~of the~~ Internet Protocol address ~~addresses of the~~ nodes comprising said explicit path.

6. (Currently Amended) The method according to claim 2, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing ~~the~~ a bit-wise Exclusive-Or function on said incoming global path identifier and said ~~of the~~ Internet Protocol address ~~addresses of the~~ nodes comprising said explicit path.

7. (Currently Amended) The method according to claim 3, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said

outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address addresses of the nodes comprising said explicit path.

8. (Currently Amended) The method according to claim 4, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address addresses of the nodes comprising said explicit path.

9. (Currently Amended) A method for routing a data packet through at least one explicit path in a data communication network, said data packet having a source/destination data pair, said at least one explicit path having specified a plurality of network nodes that form a route from a source network node to a destination network node, said data communication network comprising a plurality of network nodes, the method comprising the steps of:

receiving said data packet having said source/destination data pair;

assigning calculating a global path identifier to an for said at least one explicit path
through said data communication network;

performing a look-up function into a forwarding table using an index based on said source/destination data pair to determine a forwarding table entry related to a next network node along said route to which said data packet should be forwarded;

inserting said global path identifier into said data packet; and

forwarding said data packet to said next network node ~~determining the next hop along~~
~~said explicit path as a function of said global path identifier.~~

10. (Currently Amended) The method according to claim 9, wherein said global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

11. (Currently Amended) The method according to claim 9, wherein each of said plurality of network nodes has assigned to it an Internet Protocol address and said global path identifier is ~~assigned~~ calculated by performing the a bit-wise Exclusive-Or function ~~of the~~ on said Internet Protocol addresses of ~~the~~ said plurality of network nodes comprising said at least one explicit path.

12. (Currently Amended) The method according to claim 10, wherein each of said plurality of network nodes has assigned to it an Internet Protocol address and said global path identifier is ~~assigned~~ calculated by performing the a bit-wise Exclusive-Or function ~~of the~~ on said Internet Protocol addresses of ~~the~~ said plurality of network nodes comprising said at least one explicit path.

13. (Currently Amended) An apparatus for routing a data packet ~~packets~~ through an explicit path in a data communication network, said data packet having an incoming global path identifier corresponding to said explicit path, said data communication network comprising a plurality of network nodes, each of said plurality of network nodes including a network device,

said explicit path comprising a plurality of hops including a prior hop, a current hop, and a next hop, each of said plurality of hops being associated with one of said plurality of network nodes, the apparatus comprising:

means for receiving a said data packet from said prior hop at said current hop in said in a first network device;

means for ~~determining whether said received data packet contains a global path identifier, and if so,~~ performing a look-up function into a forwarding table using an index based on said incoming global path identifier to determine a forwarding table entry related to said the next hop to which said ~~received~~ data packet should be forwarded;

means for calculating ~~a new~~ an outgoing global path identifier for said data packet as a function of (1) said incoming global path identifier and of the address of a port on the (2) an identifier of said network device receiving said data packet at said current hop; and

means for forwarding said data packet to said next hop.

14. (Currently Amended) The apparatus according to claim 13, wherein there are two explicit paths that merge at a network node and share a single same entry in said forwarding table in all downstream network nodes.

15. (Currently Amended) The apparatus according to claim 13, wherein said outgoing global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

16. (Currently Amended) The apparatus according to claim 14, wherein said outgoing global path identifier is inserted in the into an optional field of an Internet Protocol ("IP") packet header for said data packet.

17. (Currently Amended) The apparatus according to claim 13, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address ~~addresses of the nodes comprising said explicit path.~~

18. (Currently Amended) The apparatus according to claim 14, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address ~~addresses of the nodes comprising said explicit path.~~

19. (Currently Amended) The apparatus according to claim 15, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address ~~addresses of the nodes comprising said explicit path.~~

20. (Currently Amended) The apparatus according to claim 16, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address ~~addresses of the nodes comprising said explicit path.~~

21. (Currently Amended) An apparatus for routing a data packet through at least one explicit path in a data communication network, said data packet having a source/destination data pair, said at least one explicit path having specified a plurality of network nodes that form a route from a source network node to a destination network node, said data communication network comprising a plurality of network nodes, the apparatus comprising:

means for receiving said data packet having said source/destination data pair;

means for assigning calculating a global path identifier to an for said at least one explicit path through said data communication network;

means for performing a look-up function into a forwarding table using an index based on said source/destination data pair to determine a forwarding table entry related to a next network node along said route to which said data packet should be forwarded;

means for inserting said global path identifier into said data packet; and

means for forwarding said data packet to said next network node ~~determining the next hop along said explicit path as a function of said global path identifier.~~

22. (Currently Amended) The apparatus according to claim 21, wherein said global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

23. (Currently Amended) The apparatus according to claim 21, wherein each of said plurality of network nodes has assigned to it an Internet Protocol address and said global path identifier is assigned calculated by performing the a bit-wise Exclusive-Or function ~~of the~~ on said Internet Protocol addresses of ~~the~~ said plurality of network nodes comprising said at least one explicit path.

24. (Currently Amended) The apparatus according to claim 22, wherein each of said plurality of network nodes has assigned to it an Internet Protocol address and said global path identifier is assigned calculated by performing the a bit-wise Exclusive-Or function ~~of the~~ on said Internet Protocol addresses of ~~the~~ said plurality of network nodes comprising said at least one explicit path.

25. (Currently Amended) An apparatus for routing a data packet through an explicit path in a data communication network, said data packet having an incoming global path identifier corresponding to said explicit path, said data communication network comprising a plurality of network nodes, each of said plurality of network nodes including a network device, said explicit path comprising a plurality of hops including a prior hop, a current hop, and a next hop, each of said plurality of hops being associated with one of said plurality of network nodes, the apparatus comprising:

an input interface for receiving a said data packet from said prior hop at said current hop
in said in a first network device;

~~packet examination logic for determining whether said received data packet contains a~~
~~global path identifier, and if so, table search logic for performing a look-up function into a~~
forwarding table using an index based on said incoming global path identifier to determine a
forwarding table entry related to said the next hop to which said ~~received~~ data packet should be
forwarded;

~~new~~ path identifier assignment logic which calculates ~~a new~~ an outgoing global path
identifier for said data packet as a function of (1) said incoming global path identifier and ~~of the~~
~~address of a port on the~~ (2) an identifier of said network device receiving said data packet at said
current hop; and

packet forwarding logic for forwarding said data packet to said next hop.

26. (Currently Amended) The apparatus according to claim 25, wherein there are two
explicit paths that merge at a network node and share a single same entry in said forwarding
table in all downstream network nodes.

27. (Currently Amended) The apparatus according to claim 25, wherein said outgoing
global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet
header for said data packet.

28. (Currently Amended) The apparatus according to claim 26, wherein said outgoing global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

29. (Currently Amended) The apparatus according to claim 25, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing ~~the~~ a bit-wise Exclusive-Or function on said incoming global path identifier and said ~~of the~~ Internet Protocol address ~~addresses of the nodes comprising said explicit path~~.

30. (Currently Amended) The apparatus according to claim 26, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing ~~the~~ a bit-wise Exclusive-Or function on said incoming global path identifier and said ~~of the~~ Internet Protocol address ~~addresses of the nodes comprising said explicit path~~.

31. (Currently Amended) The apparatus according to claim 27, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing ~~the~~ a bit-wise Exclusive-Or function on said incoming global path identifier and said ~~of the~~ Internet Protocol address ~~addresses of the nodes comprising said explicit path~~.

32. (Currently Amended) The apparatus according to claim 28, wherein said network device has assigned to it an Internet Protocol address as said identifier of said network device and said outgoing global path identifier is calculated by performing the a bit-wise Exclusive-Or function on said incoming global path identifier and said of the Internet Protocol address ~~addresses of the nodes comprising said explicit path.~~

33. (Currently Amended) An apparatus for routing a data packet through at least one explicit path in a data communication network, said data packet having a source/destination data pair, said at least one explicit path having specified a plurality of network nodes that form a route from a source network node to a destination network node, said data communication network comprising a plurality of network nodes, the apparatus comprising:

an input interface for receiving said data packet having said source/destination data pair;
global path identifier assignment circuitry for ~~assigning~~ calculating a global path identifier ~~to an~~ for said at least one explicit path through said data communication network;
table search logic for performing a look-up function into a forwarding table using an index based on said source/destination data pair to determine a forwarding table entry related to a next network node along said route to which said data packet should be forwarded;

global path identifier insertion circuitry for inserting said global path identifier into said data packet; and

packet forwarding logic for forwarding said data packet to said next network node next
~~hop selection logic for selecting the next hop along said explicit path as a function of said global path identifier.~~

34. (Currently Amended) The apparatus according to claim 33, wherein said global path identifier is inserted ~~in the~~ into an optional field of an Internet Protocol ("IP") packet header for said data packet.

35. (Currently Amended) The apparatus according to claim 33, wherein each of said plurality of network nodes has assigned to it an Internet Protocol address and said global path identifier is ~~assigned~~ calculated by performing the a bit-wise Exclusive-Or function ~~of the~~ on said Internet Protocol addresses of the said plurality of network nodes comprising said at least one explicit path.

36. (Currently Amended) The apparatus according to claim 34, wherein each of said plurality of network nodes has assigned to it an Internet Protocol address and said global path identifier is ~~assigned~~ calculated by performing the a bit-wise Exclusive-Or function ~~of the~~ on said Internet Protocol addresses of the said plurality of network nodes comprising said at least one explicit path.

37. (Currently Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for routing a data packet ~~packets~~ through an explicit path in a data communication network, said data packet having an incoming global path identifier corresponding to said explicit path, said data communication network comprising a plurality of network nodes, each of said plurality of network nodes including a network device, said explicit path comprising a plurality of hops

including a prior hop, a current hop, and a next hop, each of said plurality of hops being associated with one of said plurality of network nodes, the method comprising the steps of:

receiving a said data packet from said prior hop at said current hop in said ~~in a first~~ network device;

~~determining whether said received data packet contains a global path identifier, and if so,~~ performing a look-up function into a forwarding table using an index based on said incoming global path identifier to determine a forwarding table entry related to said the next hop to which said ~~received~~ data packet should be forwarded;

calculating ~~a new~~ an outgoing global path identifier for said data packet as a function of (1) said incoming global path identifier and ~~of the address of a port on the~~ (2) an identifier of said network device receiving said data packet at said current hop; and

forwarding said data packet to said next hop.

38. (Currently Amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for routing a data packet through at least one explicit path in a data communication network, said data packet having a source/destination data pair, said at least one explicit path having specified a plurality of network nodes that form a route from a source network node to a destination network node, said data communication network comprising a plurality of network nodes, the method comprising ~~the steps of:~~

receiving said data packet having said source/destination data pair;

~~assigning~~ calculating a global path identifier ~~to an~~ for said at least one explicit path through said data communication network;

performing a look-up function into a forwarding table using an index based on said
source/destination data pair to determine a forwarding table entry related to a next network node
along said route to which said data packet should be forwarded;
inserting said global path identifier into said data packet; and
forwarding said data packet to said next network node ~~determining the next hop along~~
~~said explicit path as a function of said global path identifier.~~